An Overview of the Model Output Statistics System

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Abstract

Model Output Statistics (MOS) forecast guidance has been provided to National Weather Service (NWS) forecasters and private entities for over four decades. MOS provides objective interpretation of numerical weather prediction models by relating observed weather elements to model predictors via a statistical approach. What began as the first operational application in 1969 as a three-element PE model-based message for 79 locations, has grown into a world class system commensurate with the size and scope of modern numerical weather prediction models. We now produce MOS guidance for more than 11,000 sites across the U.S. and its territories, and grids as fine as 2.5 km resolution. This guidance requires 7 hours a day of run time on the NWS production supercomputer, 150,132 lines of executable code, and 3.7 million unique statistical equations. Challenged to maintain a skillful MOS system in the face of frequent NWP model updates, today's efforts are focused on innovative approaches to respond to model changes, adapting our processing to new computing and IT environments, and responding to evolving weather services.

This talk will describe the current NWS MOS system: from data collection, through development of statistical forecast relationships, to product generation and dissemination to our users. Examples of MDL's MOS and related statistical guidance products will be shown, including our most recent efforts on the development of high resolution guidance on grids and our contribution to the National Blend of Global Models project. Downstream dependent or derived products add additional value to the MOS system and tailor products for specific customers. Examples of the Localized Aviation MOS Product, one such derived system, will also be shown. Today's NWS MOS system makes interpretive statistical weather forecasts accessible to a wide and diverse group of users: from government and military meteorologists to students, public health sector researchers, private sector forecasters in the energy and airline industries, broadcasters, and weather hobbyists and enthusiasts.